NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WASTE UTILIZATION
(acre)
CODE 633

DEFINITION

Utilizing manure, wastewater and other organic by-products and residues.

PURPOSES

This practice is applied as part of a total conservation management system to:

- Protect water and air quality.
- Provide nutrients for crop, forage, or fiber production and forest products.
- Improve and maintain soil quality.
- Provide feed for livestock
- Provide a source of energy

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where organic materials are generated and/or utilized. These materials include animal manure, animal carcasses, contaminated water from livestock and poultry operations, agricultural processing residues (e.g. whey) and solids and wastewater from municipal treatment plants .

CRITERIA

A. Regulations

Organic nutrient application to land must comply with the most restrictive of federal, state, or county laws, ordinances and permit conditions.

Land application of municipal sewage sludge is addressed by the Minnesota Pollution Control Agency (MPCA) through Minnesota Rule R. chapter 7041 available online at:

http://www.revisor.leg.state.mn.us/forms/getrulechap.shtml

Land application of industrial sludge and processing wastes are addressed as necessary in the permit process by MPCA.

Disposal of individual sewage treatment system septage is governed by 40 Code of Federal Register part 503.

Land application of manure is addressed by MPCA through Minnesota Rule R. chapter 7020 online at:
http://www.revisor.leg.state.mn.us/forms/getrulechap.shtml

Acceptable dead animal (carcass) disposal is regulated by The Minnesota Board of Animal Health through Minn. Statute 35.82 and Minnesota Rule1719. MPCA and Minn. Dept. of Natural Resources rules also apply.

The sale of composted manure or manure sold as a soil amendment is regulated by the Minnesota Department of Agriculture (MDA).

The use of animal parts or manure as a source of feed for other animals is regulated by the U.S. Food and Drug Administration, the MDA (Minnesota statutes 25.31 to 25.43) at: http://www.revisor.leg.state.mn.us/stats/25/ and the Mn. Board of Animal Health (Minn.Rule Chapter 1719) at http://www.revisor.leg.state.mn.us/forms/getrulechap.shtml

B. On-Farm Organic Materials

All Criteria in **Conservation Practice Standard 590 (Nutrient Management)** must be followed when manure and other on-farm organic materials are used as a nutrient source for crop, forage, fiber or forest product production.

C. Non-Farm Organic Nutrients

Non-farm organic materials shall be analyzed for characteristics and applied in a manner and at rates as prescribed by Minnesota law or permit requirements. All required plan and reporting requirements also apply

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Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Sewage sludge analysis, application and reporting requirements can be found in **Chapter 7041 MPCA Sewage Sludge Management Rules part 7041.1500.** Those requirements include analysis for pH, percentage of total solids; volatile solids as percentage of total solids, major plant nutrients, and concentration of various metals. The sludge generator or applicator is responsible for obtaining the analysis.

Composted manure should be analyzed, when required by Minnesota Rule 7020.0405, for pH, moisture content, particle size, NPK ratio, and soluble salt content. Composted manure used as an on-farm crop nutrient source should also be analyzed for total N, P_2O_5 and K_2O.

D. Soil Quality

Where municipal wastewater and solids are applied to agricultural lands as a nutrient source,

- The single application or lifetime limits of heavy metals shall not be exceeded.
- The concentration of salts shall not exceed the level that will impair seed germination or plant growth. Consult Minnesota Rule R. Chapter 7041 and Chapters 5, 6, and 11 of the NRCS Agricultural Waste Management Field Handbook (AWMFH) for additional details.

E. Water Quality

- All organic materials shall be utilized in a manner that minimizes the opportunity for contamination of surface and ground water supplies. Appropriate setbacks and buffer areas will be established and maintained on land application areas according to state or local regulations.
- Liquid application rates shall not exceed the soil infiltration rate or moisture holding capacity of the soil profile at the time of application.
- Organic materials shall not be land-applied on soils classified by NRCS as frequently flooded during the period when flooding is expected.
- No organic material application to frozen or snow-covered ground when required by state law (Consult Minnesota Rules Chapter 7041 and 7020). Consult Table 1 for additional limitations on wintertime applications.

F. Livestock Feed

Agricultural wastes to be used for feedstock shall be handled in a manner to minimize contamination, preserve its feed value, and prevent disease transmission. Poultry litter stored for this purpose shall be covered. Strict adherence to federal and state laws is critical when utilizing animal parts or manure as a feedstock.

The feed product shall be free of harmful pathogens, pesticide residues, parasites, and heavy metal or drug residues above levels permitted by statute or regulation.

An animal nutritionist shall develop rations that utilize wastes in compliance with federal and state regulations.

G. Energy Source

Use of agricultural waste for energy production should be a part of the overall waste management system.

All energy producing components of the system shall be included in the waste management plan and provisions for utilization of residues of energy production identified.

H. Mortality Disposal

Mortality disposal must be conducted in strict adherence to state rules. Consult Appendix A for disposal alternatives.

I. Idled Cropland with a Perennial Cover, CRP or Similar Land

Apply organic nutrients to CRP only after obtaining approval from the appropriate agency including USDA's Farm Service Agency.

Apply organic nutrients only in emergency situations such as inability to spread on cropland because of flooding situations.

Apply only once in a three-year period to the same location in CRP fields.

Limit organic materials spread on CRP or similar land to that generated only by the landowner.

Base application rates on the amount needed to supply 30 lbs./ac. total nitrogen (N) on coarse

textured soils and 60 lbs./ac. N on other soil types (increase to 80 lbs./ ac. N on other than coarse textured soils for drag hose applications if the 60 lb./ac. rate cannot be applied).

Apply on areas furthest from receiving waters or that have gentlest slopes and also have lowest Soil Test Phosphorus levels.

Time application to periods of greatest plant nutrient need. Do not apply when the ground is frozen, snow covered or actively thawing.

Do not apply organic materials on soils classified by USDA-NRCS as frequently flooded.

Periodically test for soil P content and cease applications when test results indicate 75 ppm or higher Bray 1 phosphorus (60 ppm Olsen).

Do not apply organic nutrients to the entire field. Leave large enough portions of the field undisturbed to provide nesting and cover habitat for wildlife.

Maintain vegetation on CRP fields at no less than an 80% cover condition after application. Repair and reseed areas damaged by application of organic nutrients.

CONSIDERATIONS

Travel Time
Consider travel time and route to fields when scheduling fields for organic material applications. Minimize travel time on roads and highways.

Time of Day and Odor
Consider morning applications to minimize odor if applications on warm days are necessary.

Good Neighbor Practices and Odor
Consider "good neighbor practices" when land applying manure and other organic by-products. These practices include not spreading: a.) before holidays and weekends when people are engaged in outdoor activities; b.) near heavily traveled highways; c.) when wind would blow odors toward populated areas and d.) on calm, humid days on fields in close proximity to residences and roadways. Also consider injection or incorporation within 24 hours if applied on sites within 300 feet of residences and 1000 feet of roads.

Nitrogen Volatilization Losses
Consider nitrogen volatilization losses associated with surface applications of manure and other organic materials. Such losses are significant unless manure is immediately incorporated into the soil. Encourage incorporation within 24 hours.

N and P excreted by animals
Consider agronomic, nutritional and managerial practices which reduce the amount of N and P excreted by animals. These practices include:

- using high quality protein sources
- feeding low protein, amino acid supplemented diets
- avoiding excessive overages of dietary P
- balancing diets on an available P basis
- using feed ingredients that possess highly available P (e.g. high-moisture corn or wheat)
- using enzyme additives such as phytase to improve ability to utilize P in rations (applies most to swine).

Alternative uses
Consider various uses of organic nutrients when developing a utilization plan (e.g. composted potting medium, biogas production, feed). Follow all regulations and precautions relative to refeeding of manure and animal parts or sale of composted materials.

Composting
Consider composting to reduce waste volume.

Consult **Manure Management Alternatives: A Supplemental Manual**, MDA, 1995; **Poultry Water Quality Handbook**, Poultry Water Quality Consortium, 1994; and **Manure Management: Practices for the Minnesota Pork Industry**, MN Ext. Serv., 1994 for additional detail on composting, refeeding, rations and other alternative uses of organic materials.

PLANS AND SPECIFICATIONS

The manure and other organic by-product plan will address all uses of manure and organic by-products including as appropriate energy production, refeeding, off-site transport and carcass disposal.

The following plan components are required when manure is utilized as a source of crop and forage nutrients:

- A description of the size and kind of livestock present including quantity of organic materials produced during the planning period.
- Description of the **manure storage and handling system** including application equipment and labor needed to apply the organic nutrient source.
- Annual amount of nitrogen and phosphorus from manure that will need to be land applied.
- Description of the manure nutrient testing practices (methods, frequency).
- Description of equipment calibration practices.
- A map with organic nutrient application areas clearly indicated.
- Components listed in the most current version of **USDA-NRCS-MN Conservation Practice Standard 590 (Nutrient Management)**

OPERATION AND MAINTENANCE

Records shall be kept for a period of six years or longer and include when appropriate:

- Quantity of manure and other organic by-products produced.
- Dates and amount of manure removed from the system due to feeding, energy production, or export from the operation.
- Carcass disposal techniques.
- Quantity of manure transported off-site to land not owned or controlled (include location of site and per acre application rate).
- Quantity of manure transported off-site to be used for other than a crop nutrient.
- Name and address of commercial hauler or applicator receiving manure.
- Consult **Conservation Practice Standard 590 (Nutrient Management)** for requirements when manure is used as a crop nutrient source.

REFERENCES

Agricultural Waste Management Field Handbook. 1992. USDA-NRCS

Animal Mortality Composting. 1999. Mn. Dept. of Agriculture

Best Management Practices: Carcass Disposal. 2000. Minn. Pollution Control Agency.

Composting: A Method of Dead Animal Disposal in Minnesota. Mn. Board of Animal Health

Composting Poultry Carcasses. 1994. North Central Regional Extension Publication 530.

General Guidelines for the Land Application of Industrial Sludge. 1994. Minn. Poll. Control Agency

Using Whey on Agricultural Land - A disposal Alternative. 1981. Univ. of Wisc. Extension publication A3098.

On-Farm Composting Handbook. 1992. Northeast Regional Agricultural Engineering Service publication NRAES-54.

Poultry Water Quality Handbook. 1994. Poultry Water Quality Consortium.

Manure Management Alternatives: A Supplemental Manual. 1995. MN Dept. of Agriculture

Nutrient Management. Conservation Practice Standard 590. 2001. USDA-NRCS

TABLE 1. SUMMARY TABLE – APPLICATION RESTRICTIONS FOR FROZEN, SNOW-COVERED OR ACTIVELY THAWING CONDITIONS

Do not recommend manure applications when ground is frozen, snow-covered or actively thawing on fields:

1) **Within 300 feet of sensitive features including surface waters, surface tile intakes, sinkholes, water supply wells, mines and quarries OR**
2) **With sheet and rill soil losses greater than 2-4 tons per acre per year OR**
3) **With uncontrolled ephemeral erosion OR**
4) **With frequently flooded soils OR**
5) **That are idled cropland with a perennial cover, CRP or similar land**

Distance to sensitive feature (feet)	Sheet and Rill Erosion (Tons/Acre/ Year)	Ephemeral Erosion (Controlled	Frequently Flooded Soils	Idled Cropland with perennial cover, CRP or similar land	Application Restrictions when ground is frozen, snow-covered or actively thawing
NA	NA	NA	**Yes**	NA	No Manure Applications
NA	NA	NA	NA	**Yes**	
NA	NA	**No**	NA	NA	
< 300	NA	NA	NA	NA	
>300	**> 4**	NA	NA	NA	No Solid Manure Applications
	> 2	NA	NA	NA	No Liquid Manure Applications

Consider selecting the lesser of the following winter-time manure application rates: a) 5000 gallons per acre/wintertime season (swine, dairy or beef); 12 tons per acre/ wintertime season (swine, dairy, or beef); or 4 tons per acre poultry, b) rates necessary to satisfy crop P removal in the harvested portions of the desired crop.

Consider injecting or incorporating manure and other organic by-products within 24 hours on all fields within a watershed listed as having surface water quality impairment due to nutrients.

Consider prioritizing and scheduling fields for manure applications based on gentleness of slope, lowest Soil Test Phosphorous levels and distance from sensitive features.

APPENDIX A
BEST MANAGEMENT PRACTICES:
CARCASS DISPOSAL§

GENERAL OVERVIEW

Carcass: The body or a part of a domestic animal or fowl that has died or has been killed, other than by being slaughtered for human or animal consumption.

Discarded Animal Parts: All or a part of animals, fish, or poultry that have been killed for human or animal consumption and not used for that purpose.

There is always mortality in animal production. Proper disposal of carcasses is important both to prevent livestock disease transmission and to protect air and water quality. This document provides options for disposal and discusses advantages, disadvantages and rule requirements of each method.

Carcass Disposal is regulated by:

- Minnesota Statute 35.82
- Minnesota Board of Animal Health Rules - 1719.0100 - 1719.4600
- Minnesota Pollution Control Agency Rules
- Minnesota Department of Natural Resources Rules

Legal Methods of Carcass Disposal

Species / **Method**	**Compost**	**Render**	**Incinerate**	**Bury**	**Exempt by Law**	**Fur Farm Consumption**	**Pet Food**
Poultry	Ö	Ö	Ö	Ö		Ö	Ö
Swine	Ö	Ö	Ö	Ö		Ö	Ö
Cattle	Ö*	Ö	Ö	Ö		Ö	Ö
Horses	Ö*	Ö	Ö	Ö		Ö	Ö
Sheep/Goats	Ö	Ö	Ö	Ö			Ö
Household Pets					Ö		
Wild Animals					Ö		
Game Farm/ Exotic Animals	*	Ö	Ö	Ö			

***Call Minnesota Board of Animal Health 651/296-2942, Ext. 27 for additional information.**

General Rules:

1. Carcass must be disposed of as soon as reasonably possible, i.e. within 48 to 72 hours.

2. Burying a carcass requires that the carcass be five feet above the seasonal high-water table and covered with dirt. Sandy or gravelly areas or areas within 10 feet of bedrock should be avoided.

3. Incineration must be in an incinerator that is approved by the Minnesota Pollution Control Agency.

4. Hauling over the road: Carcasses or discarded animal parts must be in vehicles or containers that are leak-proof and covered. The vehicles also need to be inspected and have a permit, unless the vehicle belongs to the owner of the animal before it died.

5. Composting must be done according to the protocol set forth in Board of Animal Health Rule 1719.4000. This is explained in the section on composting.

6. Fur farms need a permit and inspected vehicle to haul carcasses or discarded animal parts over the road.

♣ This appendix is adapted from a fact sheet prepared by the Minnesota Pollution Control Agency.

7. Each carcass used as pet food must pass an inspection by a veterinarian and must be processed under clean and sanitary conditions.

8. Carcasses left at an off-site pickup point must be in an animal-proof enclosed area that is at least 200 yards from a neighbor's buildings. Carcasses must be picked up within 72 hours, except if the enclosed area is refrigerated to less than 45 degrees Fahrenheit, then the carcasses must be picked up within seven days.

COMPOSTING

Composting is the process of placing carcasses in layers with a carbon source and manure to allow the natural heating process to break down the carcass. Composting is allowed for swine, sheep, goats and poultry. Composting is allowed by permit for cattle, horses and exotic animals.

Advantages
- Biosecurity
- Year-round use
- Inexpensive
- Environmentally sound
- Value-added product to sell or use
- Best and recommended method to handle catastrophic losses
- Heat of composting process kills pathogens and insect larvae
- Done on-site

Disadvantages
- May be more labor intensive
- Requires impervious pad, rot-resistant walls and cover to repel rain
- Takes some practice to develop the “art”
- Requires carbon source (straw, sawdust, cornstalks, etc.)

Recommendations
Composting is an "art" that must be practiced because of the variety in materials, weather conditions and number of carcasses. It is best to have the same person doing the composting to ensure compost performance.

Do:
- Follow protocol as specified in Board of Animal Health Rule 1719.4000
- Process mortality daily
- Keep carcasses covered and at least six inches from sides
- Take and record temperature daily (must reach 130 degrees Fahrenheit)
- Start with a base of carbon source material
- Put carcasses, litter and carbon source in layers
- Mix pile at least one time when the temperature starts to decline; this will generate a new heat cycle after each mixing

Don’t:
- Use frozen carcasses for composting
- Store carcasses before processing

Public Relations
Build composter out of sight and away from neighbors. While a compost pile that is working right will have no smell and no insects, it may bother neighbors to see carcasses going into it on a daily basis. Convince your neighbors to use the finished compost for their gardens (before you tell them what is in it).

INCINERATION

Incineration is an effective but more costly method. It is a good cold weather alternative.

Advantages
- Can use year-round
- Biosecurity (no trucks coming from other farms to pick up carcasses)

Disadvantages
- Incinerator cost
- Fuel cost – expensive
- Odor
- Very expensive for larger carcasses

Recommendations
- Place your incinerator out of sight or enclosed with a decorative screen
- Consider the wind direction and time of the day, so as to least effect your neighbors

Do:
- Purchase MPCA-approved incinerator
- Purchase unit large enough to handle each day's mortality
- Properly maintain unit
- Incinerate mortality daily

Don't:
- Accumulate carcasses for days before incinerating
- Incinerate when neighbor down-wind is having a barbecue, etc.
- Forget to pay your gas bill

Public Relations
Most problems from incineration come from the odor of burning hair or feathers when it interferes with a neighbor's outdoor activities.

BURIAL

Burial requires great care in site selection because as carcasses decompose, they release materials that can pollute ground water, particularly if large volumes are buried. This practice is most suitable for small amounts of material (e.g. less than 2000-lb./burial pit/acre).

Advantages
- Inexpensive (if own equipment)
- Biosecurity (No trucks coming from other farms to pick up carcasses)

Disadvantages
- Difficult in winter
- Can cause ground-water pollution
- Cannot bury within five feet above seasonal high-water table

Recommendations
- Should not be used by large facilities or with catastrophic losses because the volume of carcasses may lead to ground-water pollution.
- Examine other alternatives for dead livestock disposal.

Do:
- Cover with soil and stay five feet above the seasonable water table
- Cover each day's deposits with a layer of soil
- Identify sites for worker safety
- Bury immediately

Don't:
- Place in or near lakes, ponds, rivers, streams, wetlands, ditches or wells
- Use as a dump for other farm garbage
- Bury in areas with a high seasonal water table
- Bury in "karst" or sandy areas
- Bury in areas subject to surface water flooding

Public Relations
Problems arise when using burial pits and when burying a carcass too near a neighbor's well. The neighbors complain about burial pits when any smell comes from the farm – they assume it is from the pit. Problems also arise when carcasses are not properly covered each day and dogs or wild animals drag off parts of the carcasses.

RENDERING

Rendering offers the grower the chance to create a recyclable feed product if it is submitted to the renderer with proper handling.

Advantages
- Recyclable resource
- Can use year-round

Disadvantages
- Lack of biosecurity when carcasses are picked up
- Cost
- Not available in all areas
- Not available for all species

Recommendations
- Get on an annual contract with the renderer rather than a "per call" charge
- If large enough farm, get on a scheduled weekly or twice weekly pick-up route
- Use off-site pick up points for biosecurity purposes
- Consider refrigerated off-site pick up points

Do:
- Know what substances the animals were exposed to in order to avoid residue problems in the rendered product
- Follow Board of Animal Health Rules for off-site pick up point
  - ✓ Must be animal-proof enclosure at least 200 yards from neighbor's buildings.
  - ✓ Carcasses may not be left for more than 72 hours unless refrigerated -- then seven days.
- Be aware of potential disease spread from a rendering truck.
- Vehicles or containers must be leak-proof and covered to haul carcasses over the road. (Contracted vehicles also need a permit from the Board of Animal Health.)

Don't:
- Delay calling for carcass pickup
- Leave carcasses where other animals can drag them off
- Leave carcasses in public view

Public Relations
Neighbors are most upset when carcasses are left where other animals can drag them into their yards or when carcasses can be seen from the road. Off-site pick-up points are required to be animal-proof enclosures.

ALTERNATIVE METHODS

The Board of Animal Health may permit alternative methods of carcass disposal that are effective for the protection of public health and the control of livestock diseases. **All alternative methods require a permit from the Board of Animal Health (651) 296-2942**

1. Pet Food Processing
- Requires permit, veterinary inspection of each carcass, facilities and equipment that meet Board of Animal Health specifications

2. Fur Farm Consumption
- Fur farm is required to have a permit and to keep the farm in a sanitary condition
- Permits allow only the feeding to fur-bearing animals that do not re-enter the food chain
- Owner assumes the risk of a disease or condition in the carcass that could be detrimental to the fur animals

3. Grinding and Injecting into the Manure Pit
- A permit was granted to the University of Minnesota for an experimental project
- Field trials were conducted in 1996
- A disadvantage may be neighbors' perception that the smell from the manure pit is worse because of the carcasses in it

4. Lactic Fermentation
- Lactic fermentation utilizes a mixture of ground carcasses and a carbohydrate source to produce a "silage" type product for refeeding

5. Extrusion
- Extrusion is a method whereby ground carcasses and a carrier such as soybean meal are cooked under pressure and moisture, generating steam and a product with 12 percent moisture for refeeding.

6. Emergency, Commercial or Experimental Composting
- In emergency or catastrophic loss - call the Board of Animal Health for a permit and advice on composting the losses
- Experimental composting must be in conjunction with a University and requires a permit
- Cattle and other species may be experimentally composted if the protocol is approved

REFERENCES FOR MORE INFORMATION

University of MN Extension Service
(612) 624-4928

MN Board of Animal Health
(651) 296-2942

MN Pollution Control Agency
Toll Free (877) 333-3508

MN Dept. of Natural Resources (Wetlands)
(651) 296-4800